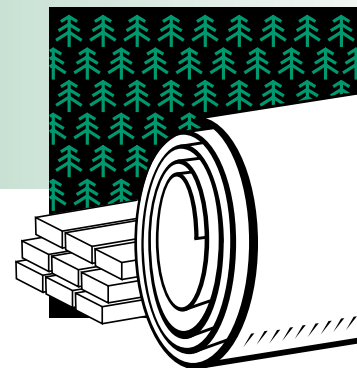


FOREST PRODUCTS

Project Fact Sheet



TESTING A NEW TYPE OF FIXED BED BIOMASS GASIFIER IN A MODULAR 100 kW ELECTRIC POWER GENERATING PLANT

NEW METHOD OF ELECTRIC COGENERATION SAVES ENERGY AND RESOURCES

Benefits

- Offers annual savings of 19.6 billion Btu from reduced oil use per 600 kW per installation
- Offers industry-wide savings of 0.5 trillion Btu by 2010
- Many sites will make use of cogeneration potential
- Fueling the plants will come in part of low-grade trees and waste wood that will improve forest management and reduce fire risk

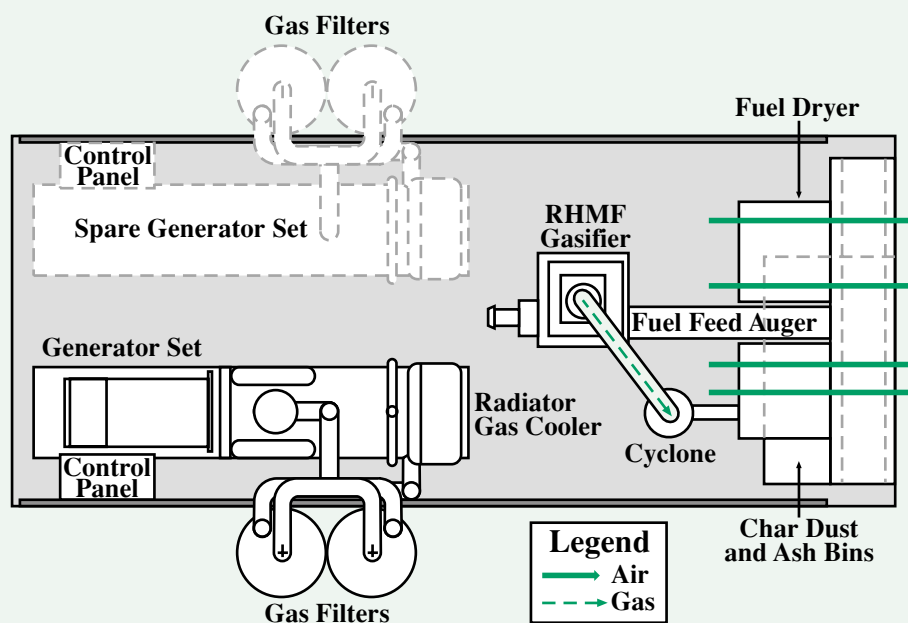
Applications

Can be used by forest products plants having a source of waste wood to produce electricity and steam.

At the present time there are no woodchip gasifiers on the market capable of producing engine quality gas in the United States in the size range of 100 kW to 1000 kW. Historically, downdraft gasifier manufacturers specified hardwood blocks or briquettes as their fuel, and allowed fine char to pass through the grate unconverted. The fine char and large spectrum of char particle sizes from chipped fuel causes buildup in the reduction zone, resulting in low gas flow, and therefore low fuel and air consumption, and temperatures which are too low for effective operation.

Gazogen will develop and test an automated containerized 100 kW electric cogeneration plant utilizing a new type of fixed bed gasifier, specifically designed for woodchip fuel. The Rotary Hearth Mixed Flow Gasifier (RHMFG) combines features that prevent fuel bridging, char bed buildup and channeling,

ROTARY HEARTH MIXED FLOW GASIFIER



The Gazogen, Inc., gasifier converts waste woodchips into engine quality gas to be used in an onsite cogeneration plant reducing electricity and fuel use.



and this results in more power and better gas quality. The project will support further testing and development of automated controls and performance data acquisition, and will partially fund the construction and field testing of a complete 100 kW electric cogeneration plant utilizing commercially available green hardwood chips.

Use of this new technology would replace a portion of the electricity produced by central power stations with distributed generation using waste wood from low-grade trees or other biomass sources. Distributed generation reduces power line losses, reduces the need to expand transmission and distribution systems, and provides the opportunity to use cogenerated heat.

Project Description

Goal: To develop and market a highly efficient technology for producing electricity and steam from waste wood that is scaled to end users' needs, that is automated, and that is not difficult to maintain. Another requirement is for the technology to meet the same high standard of environmental performance as is expected from other renewable energy sources.

The RHMF gasifier is expected to produce the same very low level of hydrocarbons in its gas composition as traditional downdraft gasifiers, so engine exhaust will be nearly hydrocarbon free. Particulates in the gas must be reduced to a very low level before the gas can be burned without adverse consequences to the internal combustion engine. The gasification technology and the equipment that removes the particulates must therefore be very effective.

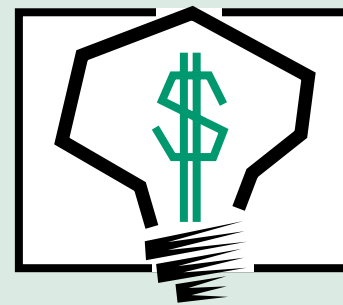
Progress and Milestones

The following are the main tasks to be performed:

- Build an integrated RHMF gasifier including programming an automated control panel and data acquisition system, constructing a fuel dryer and feeder, and installing a gas cleaner and 100 kW generator set.
- Shop test the new gasifier and optimize the automated controls to maximize the efficiency of the system and minimize the emissions.
- Install the gasifier in the field and test the 100 kW integrated plant.

Economics and Commercial Potential

Vermont forests alone offer the potential for 154 MW of capacity on a sustainable basis. Technology commercialization will start with direct sales then move to partnerships with existing energy system providers. Commercial introduction of the technology is expected by 2004. Annual energy savings by 2010 would be 0.5 trillion Btu with 25 units operating with the technology. By 2020 the savings would grow to 3 trillion Btu with 169 sites using the technology.



The Inventions and Innovation Program works with inventors of energy-related technologies to establish technical performance and to conduct early development. Ideas that have significant energy-savings impact and market potential are chosen for financial assistance through a competitive solicitation process. Technical guidance and commercialization support are also extended to successful applicants.

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